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10/714,174

11/14/2003

Atsuhiro Sakurai

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TEXAS INSTRUMENTS INCORPORATED

P O BOX 655474, M/S 3999

DALLAS, TX 75265

EXAMINER

JONES, DANELLE E

ART UNIT

PAPER NUMBER

2626

NOTIFICATION DATE

DELIVERY MODE

06/18/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com

uspto@dlemail.itg.ti.com

| | | | |
|------------------------------|-------------------------------|--------------------------------|--|
| Office Action Summary | Application No. 10/714,174 | Applicant(s) SAKURAI ET AL. | |
| | Examiner Danelle E. Jones | Art Unit 2626 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>9/17/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 10 is objected to because of the following informalities: Claim 10 depends upon the method of claim 1, lacking antecedent basis for the digital audio apparatus. To expedite prosecution, it is assumed by the examiner that claim 10 should read "The digital audio apparatus of claim 6." Appropriate correction is required.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-5 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims to processes that do nothing more than solve mathematical problems or manipulate abstract ideas or concepts are non-statutory. If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. *Schrader*, 22 F.3d at 294-95, 30 USPQ2d at 1458-59. Thus, a process consisting solely of mathematical operations without some claimed practical application is drawn to non-statutory subject matter.

In this case, the claims merely recite a step of "computing a plurality of parameters ... in the audio signal", without any practical application being recited (i.e., the results are not tangible because they are not real-world results - the computation remains with the computer). For the claimed process to be statutory it must indicate a

practical application where, the claim must either: (A) result in a physical transformation outside the computer for which a practical application is either disclosed in the specification or would have been known to a skilled artisan (pre-computer or post-computer process activity), or (B) be limited to a practical application that produces a useful, concrete, and tangible result.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dolson US 6,112,169 in view of Julius O. Smith, Bark and ERB Bilinear Transforms, in IEEE Transactions on Speech and Audio Processing, Vol. 7, No. 6, November 1999. Regarding **claim 1**, Dolson discloses a method of time scale modification of a digital audio signal comprising the steps of: calculating a discrete Fourier transform of first equally spaced, overlapping time windows having a first overlap amount (see col. 5, lines 3-6); partitioning the spectrum into a plurality of contiguous spectral bands (see col. 5, lines 17-19); identifying a dominant spectral line having the greatest magnitude within each spectral band (see col. 5, lines 19-20);

calculating a phase difference for the dominant spectral line of each spectral band by a phase vocoder algorithm (see col. 5, lines 34-37, where the dominant spectral line is included if the dominant lines of each region are determined);

calculating a phase difference for each of a predetermined number of spectral lines near the dominant spectral line within each spectral band as the phase difference of the corresponding dominant spectral line (see col. 5 lines 34-37, where the predetermined number is the number of divided frequency regions);

calculating a phase difference for other spectral lines of each spectral band by the phase vocoder algorithm (see col. 5, lines 34-37, where it is indicated that it is preferable to only calculate for significant peaks, indicating that the phase of other peaks may be calculated);

and calculating an inverse discrete Fourier transform resulting in equally spaced, overlapping time windows having a second overlap amount employing the calculated phase difference for each spectral line, the second overlap selected having a ratio to the first overlap amount to achieve a desired time scale modification (see col. 5, lines 62-65).

Dolson does not disclose partitioning the spectrum into a plurality of contiguous spectral bands according to a Bark scale where each spectral band has an extent dependent upon human frequency perception. However this feature is well known in the art as evidenced by Smith et al, who discloses that a Bark Scale has the critical bands of human hearing a width of one Bark. Thus, it would have been obvious to one of ordinary skill in that art at the time the invention was made to use the Bark Scale to

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perceptually identify spectral bands because a closer correspondence is obtained with spectral information processing in the ear (see Smith et al. Introduction, Paragraph 1).

Regarding **claim 2**, the limitations of claim 1 have been met as discussed above.

Dolson does not disclose: the predetermined number of spectral lines near the dominant spectral line is 4 for a 1024-point spectrum. However this feature is well known in the art to allow a human to easily pick out the spectral lines due to the distribution of the amplitudes. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use four dominant spectral lines for a 1024-point spectrum.

Regarding **claim 3**, the limitations of claim 1 have been met as discussed above, Dolson further disclosing the step of: merging nearby spectral lines that are within a predetermined frequency range of each other prior to calculating the phase difference (see col. 5, lines 21-24, where the spectral lines are merged when "borders between contiguous frequency regions are selected".)

Regarding **claim 4**, the limitations of claim 1 have been met as discussed above, Dolson further disclosing wherein: said step of partitioning the spectrum into a plurality of contiguous spectral bands according to a Bark scale employs predetermined spectral bands unrelated to the digital audio signal (see col. 5, lines 19-20).

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Regarding **claim 5**, the limitations of claim 1 have been met as discussed above, Dolson further disclosing : said step of partitioning the spectrum into a plurality of contiguous spectral bands according to a Bark scale includes adjusting boundaries of spectral bands to maintain important frequency groups within the same spectral band (see col. 5, lines 20-24).

Regarding **claim 6**, Dolson discloses a digital audio apparatus comprising:
a source of a digital audio signal (see col. 4, lines 32-33, where a sound signal is divided, indicated there must be a source for the a an audio signal);
a digital signal processor connected to said source of a digital audio signal programmed to perform time scale modification on the digital audio signal by calculate a discrete Fourier transform of first equally spaced, overlapping time windows having a first overlap amount (see fig. 1, element 120, see col.5, lines 3-6),
partition the spectrum into a plurality of contiguous spectral bands (see col. 5, lines 17-19),
identify a dominant spectral line having the greatest magnitude within each spectral band (see col. 5, lines 19-20),
calculate a phase difference for the dominant spectral line of each spectral band by a phase vocoder algorithm (see col. 5, lines 34-37, where the dominant spectral line is included if the dominant lines of each region are determined);
calculate a phase difference for each of a predetermined number of spectral lines near the dominant spectral line within each spectral band as the phase difference of the

corresponding dominant spectral line(see col. 5 lines 34-37, where the predetermined number is the number of divided frequency regions);

calculate a phase difference for other spectral lines of each spectral band by the phase vocoder algorithm(see col. 5, lines 34-37, where it is indicated that it is preferable to only calculate for significant peaks, indicating that the phase of other peaks may be calculated);

and calculate an inverse discrete Fourier transform using equally spaced, overlapping time windows having a second overlap amount employing the calculated phase difference for each spectral line thereby forming a time scale modified digital audio signal, the second overlap selected having a ratio to the first overlap amount to achieve a desired time scale modification and calculating an inverse discrete Fourier transform resulting in equally spaced, overlapping time windows having a second overlap amount employing the calculated phase difference for each spectral line, the second overlap selected having a ratio to the first overlap amount to achieve a desired time scale modification (see col. 5, lines 62-65).

and an output device connected to the digital signal processor for outputting the time scale modified digital audio signal (see fig. 1, element 110).

Dolson does not disclose partitioning the spectrum into a plurality of contiguous spectral bands according to a Bark scale where each spectral band has an extent dependent upon human frequency perception. However this feature is well known in the art as evidenced by Smith et al. who discloses that a Bark Scale has the critical bands of human hearing a width of one Bark. Thus, it would have been obvious to one of

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ordinary skill in that art at the time the invention was made to use the Bark Scale to perceptually identify spectral bands because a closer correspondence is obtained with spectral information processing in the ear (see Smith et al. Introduction, Paragraph 1).

Regarding **claim 7**, the limitations of claim 6 have been met as discussed above.

Dolson does not disclose: the predetermined number of spectral lines near the dominant spectral line is 4 for a 1024-point spectrum. However this feature is well known in the art to allow a human to easily pick out the spectral lines due to the distribution of the amplitudes. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use four dominant spectral lines for a 1024-point spectrum.

Regarding **claim 8**, the limitations of claim 6 have been met as discussed above.

Dolson further disclosing wherein: said digital signal processor is further programmed to merge nearby spectral lines that are within a predetermined frequency range of each other prior to calculating the phase difference (see col. 5, lines 21-24, where the spectral lines are merged when "borders between contiguous frequency regions are selected".)

Regarding **claim 9**, the limitations of claim 6 have been met as discussed above.

Dolson further disclosing wherein: said digital signal processor is programmed to

partition the spectrum into a plurality of predetermined spectral bands according to the Bark scale unrelated to the digital audio signal (see col. 5, lines 19-20).

Regarding **claim 10**, the limitations of claim 6 have been met as discussed above.

Dolson further disclosing wherein: said digital signal processor is programmed to partition the spectrum into a plurality of contiguous spectral bands by adjusting boundaries of spectral bands to maintain important frequency groups within the same spectral band (see col. 5, lines 20-24).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Danelle E. Jones whose telephone number is 571-270-1241. The examiner can normally be reached on M-F 7:30am - 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on 571-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJ
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RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER